

excellent agreement between theoretical and experimental results. Cylindrical vector beams have unique properties and provide significant advantages over conventional laser beams in high-resolution imaging applications. However, as we demonstrate, the focused spot size and shape is affected by the presence of phase retardance between the two orthogonal Hermite-Gauss modes that constitutes the beam. This has practical consequences as the surface based optics inherently introduce such retardance as they interact with the beam. It is shown here that a liquid crystal based variable retarder is effective to compensate such effects to recover the polarization symmetry. Thus, we theoretically study and experimentally demonstrate that by ensuring the polarization symmetry, the advantages of radially polarized beams can be fully exploited in practical high-NA microscopes.

Acknowledgments

This work was supported by Intelligence Advance Research Programs Activity via Air Force Research Labs under contract no: FA8650-11-C-7102. Bennett. B. Goldberg and M. Selim Ünlü are co-corresponding authors.